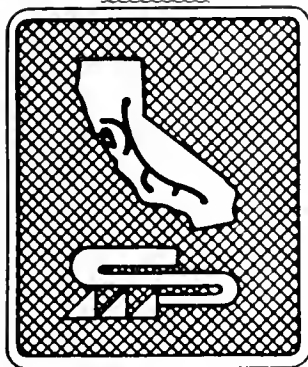


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The Resources Agency

Department of Water Resources

BULLETIN No. 119-29

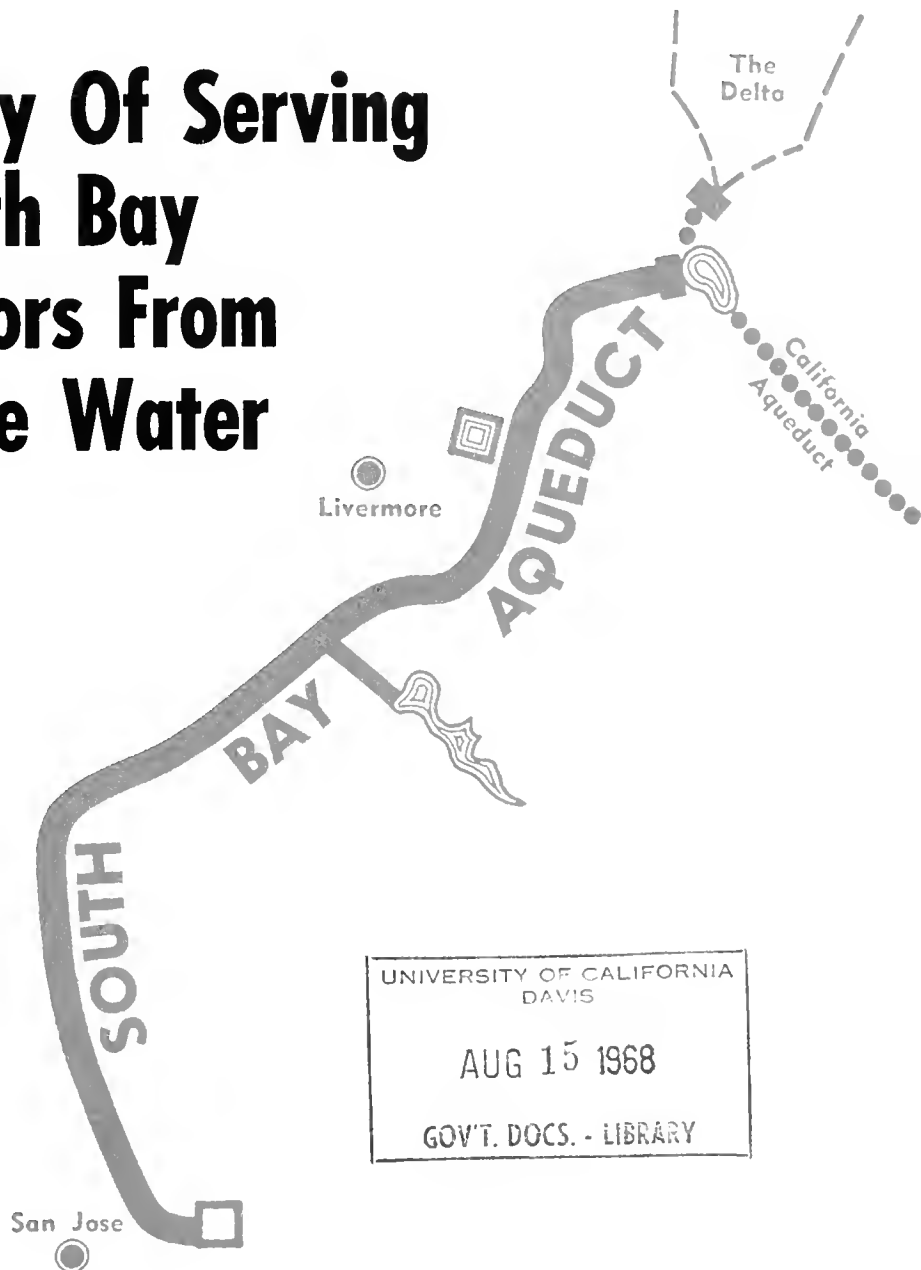
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Feasibility Of Serving The South Bay Contractors From The State Water Project

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RONALD REAGAN
Governor
State of California

WILLIAM R. GIANELLI
Director
Department of Water Resources

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State of California
The Resources Agency
DEPARTMENT OF WATER RESOURCES

RONALD REAGAN, Governor, State of California
WILLIAM R. GIANELLI, Director, Department of Water Resources
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ENGINEERING CERTIFICATION

This report has been prepared under my direction as the professional engineer in direct responsible charge of the work, in accordance with the provisions of the Civil and Professional Engineers' Act of the State of California.

Charles A. McCullough
Registered Civil Engineer
Registration No. C13617
Date March 29, 1968

ATTENT:

C. A. McCullough
District Engineer
San Francisco Bay District
Registration No. C8123
Date March 29, 1968

ABSTRACT

The three agencies now contracting for water from the South Bay Aqueduct of the State Water Project were formed to control and conserve surface water supplies, and to contract with other governmental entities to import, store, deliver, and sell water supplies. Each agency may levy taxes to fulfill these purposes.

Rapid growth of population and industry necessitated the development of a supplemental water supply. By 1990, the total annual water requirements of the three agencies are estimated to be 492,000 acre-feet. Under current contracts, these agencies have a maximum annual entitlement of 188,000 acre-feet of water from the South Bay Aqueduct, which, by 1990, will supply 160,900 acre-feet annually. Other water requirements will be met by increased development of local sources and imported supplies from the City of San Francisco's Hetch Hetchy system and the recently authorized San Felipe Project to be constructed by the United States Bureau of Reclamation.

The combined assessed valuation of the three agencies in 1964 was \$1,811,177,000 and is estimated to increase to \$4,271,500,000 by 1990. In 1964, the combined indebtedness (general obligation bonds) of the three agencies was \$326,039,000.

FOREWORD

This report presents information concerning the need for supplemental water supplies in portions of Alameda and Santa Clara counties, and includes data relating to the financial responsibilities of the three water service agencies now contracting for State Water Project water to serve the needs of those areas.

The State of California has the necessary water supply and the authority to contract with the Alameda County Water District (ACWD); the Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7); and, the Santa Clara County Flood Control and Water District (SCCFC&WD). Their contracts provide for delivery of a maximum annual entitlement of 188,000 acre-feet of water from the South Bay Aqueduct of the State Water Project. The Aqueduct has been sized to have an additional 22,000 acre-feet of transportation capacity. This additional water supply will be provided by future supplemental sources not now included in the State Water Project.

This report sets forth the terms and conditions of the water service contracts between the State and each agency, and presents information relative to the legality of the agencies to contract with the State.

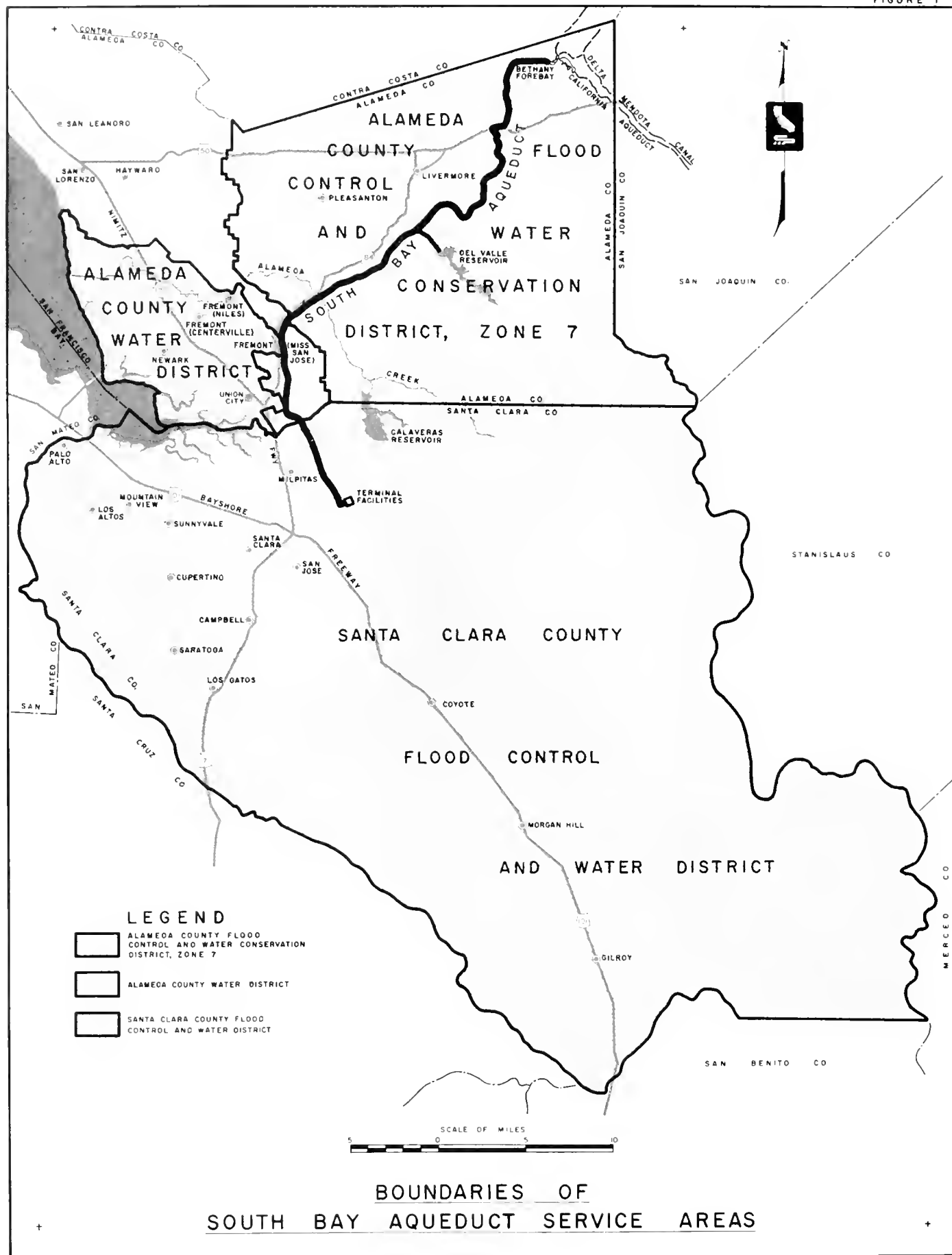
The three agencies have the authority and the need to contract with the State of California for the maximum annual entitlement of each agency. Contracts call for annual delivery of a maximum of 42,000 acre-feet of water to the Alameda County Water District; 46,000 acre-feet to the Alameda County Flood Control and Water Conservation District, Zone 7; and, 100,000 acre-feet to the Santa Clara County Flood Control and Water District.

The contractual cost to each district can continue to be met with a sound financial program based on the ability of the users to pay for water, and ad valorem assessments for benefits accruing from importation of water from the State Water Project.

Much of the information included in this report is based on material gathered during the late 1950's and early 1960's, but not formalized at that time. In some parts of the report the information has been modified to reflect changes which have occurred, in order to present a more accurate picture of conditions. However, judgment was used in making the modifications, and it is not intended that this publication be taken as a report of conditions which currently exist.

William R. Gianelli

William R. Gianelli, Director
Department of Water Resources
The Resources Agency
State of California
June 3, 1968



The three agencies presently contracting for water from the South Bay Aqueduct of the State Water Project were formed to control and conserve surface water supplies and to contract with other governmental entities to import, store, deliver, and sell water. Each agency is empowered to levy taxes to pay for any obligations incurred while fulfilling these purposes.

Under current contracts these agencies have a maximum annual entitlement of 188,000 acre-feet of water from the South Bay Aqueduct. There is an additional conveyance capacity of 22,000 acre-feet in the Aqueduct.

Development of a supplemental water supply for southern Alameda County and Santa Clara County is necessitated by the rapid growth of population and industry in the area. Information to substantiate the need for this supplemental supply was presented in two Department of Water Resources' bulletins: Bulletin No. 7, Santa Clara Valley Investigation, published in June 1955, and Bulletin No. 13, Alameda County Investigation, published in March 1963.

Within the area of the Alameda County Water District (ACWD), there are several new industries, including automotive assembly and food processing. There are two atomic laboratories which employ several thousand persons within the area served by the Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7). Within the area served by the Santa Clara County Flood Control and Water District (SCCFC&WD), the automotive, space, and electronic industries employ more than 50,000 persons. The continued development and growth of these industries was assumed in estimating future water requirements.

Total annual water requirements by 1990 are estimated to be: ACWD, 72,000 acre-feet; Zone 7, 55,000 acre-feet; SCCFC&WD, 365,000 acre-feet. In 1990, the South Bay Aqueduct will supply 36,900 acre-feet to ACWD, 32,000 acre-feet to Zone 7, and 92,000 acre-feet to SCCFC&WD. Part of the water requirements of the agencies will be supplied from local sources. In addition, the City of San Francisco's Hetch Hetchy system will supply water to ACWD and to SCCFC&WD, which is also expected to purchase water from the United States Bureau of Reclamation's San Felipe Project.

Water from the State Water Project will cost an estimated equivalent unit rate of \$21.21 per acre-foot for ACWD, \$22.22 per acre-foot for Zone 7, and \$25.59 per acre-foot for SCCFC&WD.

The combined assessed valuation in the three water agencies in 1964 was \$1,811,177,000 and it is estimated to increase by 1990 to \$4,271,500,000.

Conclusions

The State of California has the necessary water supply and the authority to contract with the three agencies now receiving water from the South Bay Aqueduct. The State Water Project can supply the required maximum annual entitlement of 188,000 acre-feet of water to the agencies.

The agencies can meet the contractual costs associated with the importation of State Water Project supplies with sound financial programs. These programs are based on the ability of the users to pay for water and ad valorem taxes assessed to the beneficiaries of the imported water.

The South Bay agencies have the necessity, the authority, and the financial capability to enter into contracts with the State of California for a combined maximum annual entitlement of 188,000 acre-feet of water, to be delivered through the South Bay Aqueduct of the State Water Project.

CHAPTER II. WATER PROJECT NEEDS AND FULFILIMENT

Alameda County and Santa Clara County are considered part of the expanded San Francisco Bay Area of Northern California. The history of each county begins with the Spanish occupation of California, and their development has been influenced by post-World War II changes which have taken place throughout the West, and especially in California.

Alameda County

Development of Alameda County began with the founding of Mission San Jose de Guadalupe in 1795. During the early 1800's, Mission San Jose became one of the most prosperous and populous of all the California missions, but development in Alameda County generally was slow. Settlement of the Livermore Valley really began in 1839 when Robert Livermore became co-grantee with Jose Noriega of 64,000 acres of land, known as Rancho las Positas. Settlement in Alameda County was stimulated by the American occupation of California in 1847 and the gold rush in 1849. The 1906 Fire and Earthquake resulted in rapid expansion of Alameda County communities, with refugees leaving San Francisco to take up residence in the East Bay.

Agricultural development in Alameda County dates from the time California belonged to Mexico. Early agriculture, which developed slowly prior to the 1850's, was stimulated by the influx of settlers during and after the gold rush and for many years was restricted largely to dry-farmed grain, pasture, and truck crops. By 1870, a large part of the area was planted in barley and wheat, but in the 1880's, grape culture became profitable in the Livermore Valley and vineyards began to replace grain. Irrigated agriculture developed slowly until the turn of the century, when diminishing profits from grain farming, together with the advent of rural electrification and the design of more satisfactory irrigation pumps, gave impetus to increases in irrigated acreage. This gradual transition from dry farming to irrigated agriculture has continued to this time.

Urbanization of the metropolitan East Bay area is presently spreading into southern Alameda County at a rate which means that, in a few years, most of the agricultural area will be urbanized. A large labor market and an excellent network of railroads and highways enhance industrial development in the County. Agricultural production supports industrial plants operating for canning, dehydrating, and freezing of fruits and vegetables. Another important Alameda County industry is the solar production and processing of salt on the tidal flats along San Francisco Bay. In the City of Fremont and in the Livermore Valley, several large aggregate plants produce sand and gravel taken from the deep and extensive alluvial deposits in southern Alameda County. Two atomic laboratories are located near the City of Livermore.

The 1960 combined population of the cities of Pleasanton and Livermore was 20,300 as compared with 6,600 in 1950 and 4,200 in 1940. These two cities are the main centers of population located within the service area of the Alameda County Flood Control and Water Conservation District, Zone 7.

The 1960 combined population of the cities of Fremont, Newark, and Union City was 60,300. No figures are available for the population of these cities in 1940 and 1950 because they were not incorporated until the late 1950's. These three cities are the main centers of population within the boundaries of the Alameda County Water District.

Physical Description of Alameda County Service Areas

The physical features of an area greatly influence its development and its possible need for imported water supplies. Geologic conditions, precipitation, natural water supplies, and elevation are a few of the notable physical features to be considered.

Alameda County Water District. The service area of the Alameda County Water District (ACWD) includes essentially all of the Bay Plain area of Alameda County south of the City of Hayward, or a total of approximately 100 square miles. All of the cities of Fremont, Newark, and Union City, and the southern portion of the City of Hayward, are within the service area, which is shown on Figure 1, page 4. Major topographic features within the boundaries of the agency include the Hayward Fault, Coyote Hills, and the western portion of Niles Canyon. Drainage from Alameda Creek enters the District from Niles Canyon and flows past Fremont and Union City before discharging into San Francisco Bay. The ACWD operates numerous percolation ponds for ground water recharge on both sides of Alameda Creek, near the City of Fremont.

The climate of the area is generally mild with average temperatures ranging from approximately 48°F in January to 64°F in July. San Francisco Bay tends to influence the climate by minimizing the extremes between winter and summer temperatures. The average annual precipitation ranges from about 14 inches at Newark to 20 inches at Union City.

Alameda County Flood Control and

Water Conservation District, Zone 7. The approximately 425-square mile service area of the Alameda County Flood Control and Water Conservation District, Zone 7, covers almost all of Alameda County not included in the Bayside Plain. The service area of Zone 7, as shown on Figure 1, page 4, includes the cities of Pleasanton and Livermore. Major topographic features within the boundaries of the agency include the Livermore Valley, an area approximately 14 miles long and 3 to 6 miles wide, where the elevation varies from approximately 650 feet in the east to 350 feet in the west; Sunol Valley, a small valley south of the City of Pleasanton; the Livermore and Pleasanton faults; and, the Diablo Range of the Coast Range, which surrounds the Livermore Valley. The area is drained principally by the Arroyo del Valle, flowing out of the Diablo Range and across the southern portion of the Livermore Valley into Arroyo de la Laguna, and by Alameda Creek, which flows into San Francisco Bay. The Arroyo Mocho and San Antonio Creek are minor streams in the area.

The climate in the Livermore and Sunol valleys may be described as semi-arid, with relatively hot, dry summers and cool, moist winters; temperatures averaging 48°F in January and 71°F in August. The average annual precipitation ranges from about 15 inches in the Livermore Valley to about 22 inches on the upper reaches of the Arroyo del Valle.

Santa Clara County

Development of Santa Clara County dates from the founding in 1777 of Mission Santa Clara on the shores of Guadalupe Creek, near the present City of Santa Clara. Land use in Santa Clara County has developed from non-irrigated pasture and hay lands, through an era of grain, to the present period of intense production of deciduous fruits, and truck and row crops.

During World War II, large numbers of military personnel and civilians employed in occupations related to the war effort were brought in to the area. The

pleasant living conditions in Santa Clara County encouraged many of them to remain in the County after the end of the war.

There are four major cities in Santa Clara County: Palo Alto, San Jose, Santa Clara, and Sunnyvale. Their combined population has grown from 96,300 in 1940 to 142,300 in 1950, and 368,300 in 1960. In 1960, the total County population of 642,300 included a 25 percent rural population.

The principal industries in Santa Clara County are the processing of agricultural products, automotive assembly, steel fabrication, chemical and cement production, and the manufacture of space, electronic, and construction equipment.

Adequate transportation facilities, a sizable labor force, and a favorable climate, are three of the factors responsible for the rapid growth of Santa Clara County.

Physical Description of the Santa Clara County Flood Control and Water District Service Area

The Santa Clara County Flood Control and Water District service area includes all of Santa Clara County, as shown on Figure 1, page 4.

That part of the Santa Clara County Flood Control and Water District service area which includes the portion of Santa Clara County lying approximately between the limits of the valley floor, north of Coyote Creek and south of Adobe Creek was used to obtain the various derived quantities shown in this report. This area covers approximately 280 square miles of the County and includes the cities of Santa Clara, San Jose, and Sunnyvale.

This part of Santa Clara County was designated Zone W-1 of the SCCFC&WD in 1962, when it was formed as the bonding zone of the District to pay the primary costs connected with importation of South Bay Aqueduct water and the treatment and distribution of the imported supply. Residents of the entire County, including residents of the portions of the County which do not receive either raw or treated water from the South Bay Aqueduct, pay special taxes to help pay a portion of the costs associated with the importation of South Bay Aqueduct water.

Major topographic features of the SCCFC&WD service area include the Santa Clara Valley, from San Francisco Bay south to Los Gatos. The service area of the District is bounded by the Diablo Range on the east and the Santa Cruz Mountains on the west.

The major natural drainage streams of Coyote Creek and the Guadalupe River and its tributaries are located in Santa Clara County. The Coyote and the Guadalupe both flow from south to north and discharge into San Francisco Bay.

The climate of the Santa Clara Valley is characterized by dry summers with moderately high daytime temperatures and cool nights, and wet winters with mild temperatures. Temperatures generally average from 49°F in January to 67°F in July. The average annual precipitation ranges from 14 inches in the San Jose area to 45 inches along the crest of the Santa Cruz Mountains.

The South Bay Aqueduct

In 1951, the South Bay Aqueduct was authorized as part of the Feather River Project. It was also included in the investigations authorized by the 1953 and 1955 Abshire-Kelly Salinity Control Barrier Acts.

Studies resulting from the 1953 Act described an aqueduct which would divert annually a total of 157,000 acre-feet of water to the Livermore Valley in Alameda County, and to Santa Clara County. The proposal was for an aqueduct which would terminate at Penitencia Creek in Santa Clara County.

In a 1955 report on financing the Feather River Project, a plan was included for extending the South Bay Aqueduct into San Benito County.

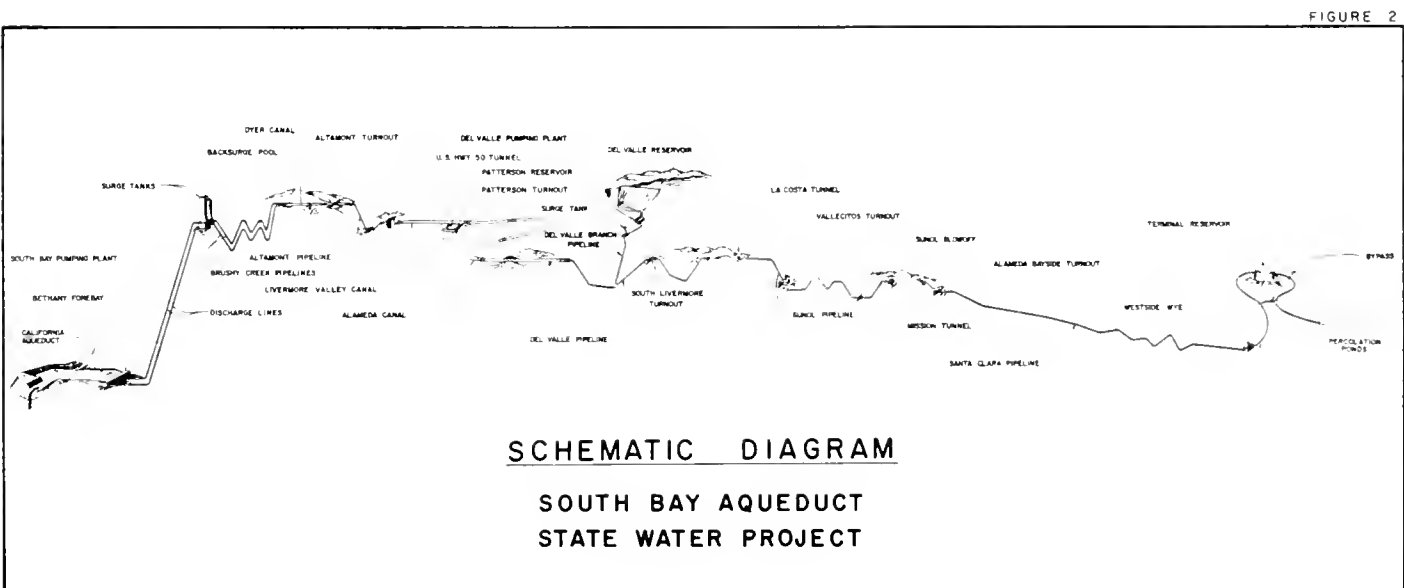
In 1956, the Legislature appropriated funds for engineering and exploration work, and for acquisition of reservoir sites. Contra Costa County was included at this time in the description of the area to be served by the proposed aqueduct.

On October 14, 1958, the Director of the Department of Water Resources, by executive order, designated that the aqueduct would be known as the South Bay Aqueduct and that its facilities would include Del Valle Dam and its reservoir, the North Livermore Valley Branch Aqueduct, and the Doolan Canyon Reservoir. The Branch Aqueduct and the Doolan Canyon Reservoir were later eliminated from the plans for the South Bay Aqueduct.

By enactment of Chapter 1300, Statutes 1959, the Legislature appropriated \$7,320,000 for initial construction of the South Bay Aqueduct.

The first water to be delivered through a facility of the State Water Project flowed into the Livermore Valley through the initial reaches of the South Bay Aqueduct on May 10, 1962. The Aqueduct was completed to its terminus near Penitencia Creek in Santa Clara County in 1965.

The interim source of water for the Aqueduct was the Delta-Mendota Canal of the United States Bureau of Reclamation's Central Valley Project. The Delta Pumping Plant and other facilities required for distribution of water from the Sacramento-San Joaquin Delta were completed and put in service at the end of 1967. The South Bay Aqueduct presently delivers water from that source to the three contracting agencies. The contract for construction of the final facility to be included in the South Bay Aqueduct, Del Valle Dam and its reservoir, was awarded in March 1966 and completion of the Del Valle Division is scheduled for 1969.



According to present estimates, the South Bay Aqueduct, including the Del Valle Division, will cost approximately \$67,000,000. The Aqueduct is designed to deliver 210,000 acre-feet of water per year. The contracts with the three water agencies now contracting for water from the Aqueduct call for a maximum annual entitlement of 188,000 acre-feet of water. There is an additional 22,000 acre-feet of transportation capacity in the Aqueduct. This water will be supplied by future supplemental sources not now included in the State Water Project. It is estimated that this maximum delivery capacity of the Aqueduct will not be required until after the year 1990.

South Bay Aqueduct Contracting Agencies

The three agencies which have contracted to import water supplies from the South Bay Aqueduct of the State Water Project share many likenesses, but have some differences in organization or purpose.

Alameda County Water District

The Alameda County Water District (ACWD) was formed in 1914 (Statutes of 1915, Chapter 35) under the California County Water District Act. Its original function was to protect underground water supplies and to develop supplemental supplies to meet future needs of water users. In 1930, the responsibility of distributing municipal water to urban developments within the boundaries of the ACWD was made an additional function.

The ACWD presently uses South Bay Aqueduct water to replenish ground water basins in the area within its boundaries, while serving customers with water that is 75 percent ground water and 25 percent water purchased from the City of San Francisco's Hetch Hetchy system.

Alameda County Flood Control and Water Conservation District

The Alameda County Flood Control and Water Conservation District was established in 1949 by a special act (Statutes of 1949, Chapter 1275) of the California State Legislature, with boundaries identical to those of Alameda County. Thus, the Alameda County Water District (ACWD) is located within the boundaries of the Alameda County Flood Control and Water Conservation District. The District was formed to aid in the solution of flood control problems, storm drainage, water conservation and supply. The Act which formed the District states that the Board of Supervisors of Alameda County:

"... shall be and is hereby designated as, and empowered to act as, exofficio the Board of Directors of the Alameda County Flood Control and Water Conservation District." (Section 6)

Zone 7. In 1957, by election of the people within the boundaries of the proposed zone, Zone 7 of the District was formed, to operate pursuant to the provisions set forth in the District Act. The budget and policies of Zone 7 are approved by a locally elected Zone 7 Board of Directors subject to confirmation by the Alameda County Board of Supervisors. The Zone has jurisdiction over more than 425 square miles in the Livermore-Amador Valley of Alameda County.

Santa Clara County Flood Control and Water District

In 1951, the Santa Clara County Flood Control and Water District was formed (Statutes of 1951, Chapter 1405) to reduce flood hazards, conserve local water

resources, and provide an adequate water supply for all of Santa Clara County. The Act states that the Board of Supervisors of Santa Clara County:

"... shall be and is hereby designated as, and empowered to act as, exofficio the Board of Directors of the Santa Clara County Flood Control and Water District." (Section 7)

Zone W-1. In 1962, Zone W-1 of the Santa Clara County Flood Control and Water District was formed as the bonding zone of the countywide water district. Residents of this zone voted to pay the costs of treating and distributing the treated water and the primary costs of the system which would be used to import water from the South Bay Aqueduct for the use of Santa Clara County residents.

Other Water Agencies

Within the boundaries of the three water districts are other water agencies, some of which buy raw or treated water from the contracting agencies and, thus, indirectly receive South Bay Aqueduct water. Other agencies depend strictly on ground water supplies, while still others buy imported water from the City of San Francisco's Hetch Hetchy system.

The Citizens Utility Company of California is the only water service agency within the boundaries of the Alameda County Water District. It services customers with supplies taken from ground water basins.

Within the boundaries of Zone 7 of the Alameda County Flood Control and Water Conservation District, there are several water service agencies. The Pleasanton Township County Water District uses ground water supplies to serve its customers, but is presently negotiating with Zone 7 to purchase additional supplies of water. The California Water Service Company, which serves portions of the City of Livermore, the Valley Community Services District, and the City of Livermore's municipal water department, all buy water from Zone 7 to resell to their own customers.

Numerous public and private water service agencies are located within the boundaries of the SCCFC&WD. Several of them buy water from Santa Clara County. These include the San Jose Water Works, the California Water Service Company, the City of Milpitas, the City of Santa Clara, and the Campbell Water Company. Other water service agencies with service areas located within the boundaries of the SCCFC&WD do not buy water supplies from the contracting agency. These include the water departments of the City of San Jose, the City of Mountain View, and the City of Sunnyvale. Water customers of these three cities are supplied from ground water basins and from water supplies purchased from the City of San Francisco's Hetch Hetchy system.

Taxing and Contracting Power of Agencies

Each of the three agencies now receiving water from the South Bay Aqueduct has the legal power to enter into contracts with the State of California for imported water supplies from the State Water Project. Each of them has the required power to levy taxes required to pay for the imported water supplies and to pay for any future costs connected with the importation.

Alameda County Water District

The Board of Directors of the ACWD has the power to levy taxes for the purpose of paying any obligation of the District which cannot be financed from water

revenues. The tax rate in 1962 was 28¢ per \$100 of assessed valuation. This tax rate has steadily declined, and the tax rate for the 1967-68 fiscal year is 15¢ per \$100 assessed valuation. A large portion of this tax is used to pay the percentage of the cost of the South Bay Aqueduct which has been allocated to the ACWD. The entire amount of tax revenues could be applied to a portion of the District's financial obligation toward payment of State Water Project facilities.

The ACWD has the power to:

"... enter into any contract ... with the State of California or any department or agency ... for the storage, regulation, control and distribution of water ... within said district ..." (Statutes of 1929, Chapter 758, Section 7)

Alameda County Flood Control and Water Conservation District

The Board of Supervisors of Alameda County may levy taxes against real property or against all property, including personal property, for the purpose of paying for required water projects. A tax of 1.5¢ per \$100 of assessed valuation is levied to pay general administrative costs and expenses of the Alameda County Flood Control and Water Conservation District, and to carry out any of the objectives or purposes of the water act which are of common benefit to all within the District. In Zone 7, the tax rate, for purposes other than bond interest and redemption, formerly could not exceed 15¢ per \$100 of assessed valuation. This tax rate can now be exceeded; however, the excess can only be used to pay for Zone 7's share of the capital costs for the South Bay Aqueduct. In addition, an ad valorem tax is levied on lands and improvements to finance the costs of bonds sold to finance the construction of local projects within the boundaries of the District. For fiscal year 1964-65, this ad valorem tax was 31¢ per \$100 of assessed valuation of lands and improvements.

The ACFC&WCD has the power to:

"... import water into the district ... to cooperate and to act in conjunction with the State of California or any of its ... department ... in the construction of any work ... for the purpose of conserving said waters ... within said district ..." (Statutes of 1949, Chapter 1275, Section 5)

Santa Clara County Flood Control and Water District

The Board of Directors of the Santa Clara County Flood Control and Water District may levy taxes upon property in the District, in both open zones and participating zones, to pay the costs and expenses of carrying out the objectives and purposes of the water act. Each zone within the District has its own tax rate and the authority to levy taxes for financing flood control improvements within that zone. For fiscal year 1964, the tax rate, throughout the entire District, was 5¢ per \$100 of assessed valuation for water supply purposes. Revenues from this tax are used to help finance the District's share of the capital costs of the South Bay Aqueduct.

The SCCFC&WD has the power to:

"... import water into the district ... to do any and every lawful act necessary to be done that sufficient water may be available for any present or future beneficial use or uses of the lands or habitants within the district ...

"... to cooperate and to act in conjunction with the State of California, or any of its ... department ... in the construction of any work ... for the purpose of conserving any water ... within said district." (Statutes of 1951, Chapter 1405, Section 5)

CHAPTER III. ECONOMY OF THE AREA SERVED BY SOUTH BAY AQUEDUCT

The service area of the ACWD is centered around the cities of Fremont, Union City, and Newark. In area, Fremont is one of the largest cities of the State and was formed when five small towns in southern Alameda County were incorporated into one city. Union City was formed shortly thereafter when two small towns in southern Alameda County were incorporated into one city.

The area served by ACWD is in transition from an agricultural to an urban economy. With the continued rapid influx of population into southern Alameda County, the economy of the service area will become more aligned with that of the Oakland-Berkeley metropolitan urban complex in the northern end of the County. The present transition period will continue until about 1990, when most of the agricultural areas in the County will be urbanized.

The population of the area served by Zone 7 is centered around the cities of Livermore and Pleasanton; the remainder of the service area is largely agricultural. The economy of the service area is expected to remain predominantly agricultural until the late 1980's. With the anticipated influx of population eastward into the Livermore Valley from communities along the eastern shore of San Francisco Bay, the economy of the area will be largely urbanized by the year 2000.

The northern portion of the Santa Clara County Flood Control and Water District's service area is already largely urbanized, with the cities of San Jose and Santa Clara making up one of the fastest growing urban areas in the State. The economy in this portion of the County is supported by the space, electronic, and automotive industries. In the southern portion of the County, the economy is changing from agriculture to urban. County planners have included green belt areas in their future planning for the expansion of urbanization, thus agriculture will remain an important part of the economy.

Table 1 shows the historical and projected population of the areas served by the three South Bay Aqueduct contracting agencies.

TABLE 1

Historic and Projected Population of the
Service Areas of the Contracting Agencies
1940 -- 1990

Year	ACWD	Zone 7	SCCFC&WD
1940	7,400	6,100	150,000
1950	11,600	9,600	245,000
1960	61,000	29,600	560,000
1964	100,000	39,700	647,500
1970	170,000	67,000	1,005,000
1980	270,000	160,000	1,395,000
1990	360,000	260,000	1,615,000

Economic Support of the South Bay Urban Economy

Industrial growth in the ACWD service area has become increasingly important to the economy of the area. In 1957, approximately 3,800 persons were employed in various industries within the area served by ACWD. This figure does not include farm labor. Since 1957, several industries, including an automotive assembly plant, have located within the area. In 1963, the industrial employment in the area was estimated to be more than 11,000 persons.

The economy of the area served by Zone 7 is expected to remain predominantly agricultural until the 1980's. The growing urban economy within the District is stabilized by two atomic laboratories located near the City of Livermore, each of which employs several thousand persons.

The urban economy of the area served by the SCCFC&WD is stabilized by the space, electronic, and automotive industries, which together employ over 50,000 persons. The space and electronic industries are expected to continue to expand, but at a slower rate than in the past.

Excellent transportation facilities are available and there is good potential for future industrial growth within the area served by the three South Bay Aqueduct contracting agencies; this indicates that a highly developed urban economy can be sustained.

The population of the area served by the contracting agencies has increased rapidly during the past 20 years and, as shown in Table 1, this population increase is expected to continue.

The population of the ACWD service area has grown at a very high rate during the 20-year period from 1940 to 1960. The Zone 7 service area presently has the smallest population of the three service areas, but it is growing at approximately three times the growth rate of the State as a whole.

The service area of the SCCFC&WD is one of the largest urban areas in the State and is continuing to grow at approximately twice the growth rate of the entire State.

Table 2 lists the 1940 and 1960 population of the areas served by the three contracting agencies and the State of California, plus the percentage of population increase during that 20-year period.

TABLE 2

Percent Increase in Population of
State of California and the Water
Service Areas Between 1940 - 1960

	1940	1960	% Increase
State of California	6,950,000	15,863,000	128%
ACWD	7,400	61,000	724%
Zone 7	6,100	29,000	385%
SCCFC&WD	150,000	560,000	273%

Estimated acreage of future urban and agricultural land served by the three South Bay Aqueduct contracting agencies indicates the extent to which the area will develop and the type of development which can be expected between 1960 and 1990.

Estimates of future urban and irrigated agricultural land use in the South Bay area are included in a Department publication, Supplement to Information and Data on Proposed Program for Financing and Constructing State Water Facilities, dated May 1960. The South Bay Area, as identified in that report, approximates the combined service area of the three agencies now contracting for water from the South Bay Aqueduct.

Table 3 lists the projected acreage for urban and irrigated agricultural land use from 1960 to 1990 in the service areas of the three contracting agencies.

TABLE 3
Projected Land Use in Acres
For Water Service Areas
1960 -- 1990

Agency	Year	Urban	Irrigated Agriculture	Total
ACWD	1960	19,400	16,000	35,400
	1970	31,700	9,000	40,700
	1980	43,400	6,000	49,400
	1990	55,400	2,000	57,400
Zone 7	1960	3,060	6,100	9,160
	1970	7,220	9,400	16,620
	1980	16,400	9,400	25,800
	1990	27,000	5,400	32,500
SCCFC&WD	1960	64,700	68,000	132,700
	1970	97,700	51,000	148,700
	1980	129,500	35,000	164,500
	1990	160,000	25,000	185,000

CHAPTER IV. WATER REQUIREMENTS AND WATER SUPPLIES

The term "water requirements", as used in this report, refers to the quantities of water, other than precipitation, which must be available to meet present and potential requirements for urban and agricultural use.

Projected water requirements for the areas served by the South Bay Aqueduct contractors were computed from data included in a report published by the Department in May 1960, Supplement to Information and Data on Proposed Program for Financing and Constructing State Water Facilities, and from other source documents.

Per capita water use for 1960 was based on data reported in Department of Water Resources' publications. Future water use, shown in Table 4, was projected by decades through 1990.

TABLE 4

Projected Water Use in Acre-Feet
For Water Service Areas
1960 -- 1990

Agency	Year	Urban	Irrigated Agriculture	Total
ACWD	1960	10,300	29,600	39,900
	1970	29,800	16,200	46,000
	1980	49,400	11,500	60,900
	1990	67,700	4,000	71,700
Zone 7	1960	5,000	10,900	15,900
	1970	11,700	14,800	26,500
	1980	28,300	14,400	42,700
	1990	46,500	8,300	54,800
SCCFC&WD	1960	107,000	118,600	225,600
	1970	194,000	88,900	282,900
	1980	274,800	61,400	336,200
	1990	321,400	43,200	364,600

Agricultural Water Use

The potential use of land in the study area which has not been developed for agricultural use, or land which is not irrigated, was included in information presented in Chapter III. Agricultural water requirements were estimated as a product of the projected crop patterns and the unit water requirements of the specific crop.

Table 4 shows the estimated agricultural water requirements from 1960 through 1990, assuming that all projected acreages indicated in Table 3 will be irrigated.

A demand exists for the indicated amounts of water shown in Table 4 for irrigated agriculture. In addition to the tax-support-to-agriculture payment capacity, the payment capacity, at farm headgate, of crops ranges from \$90 per acre-foot for grapes to \$8 per acre-foot for pasture.

Surface Water Supplies

There are no facilities for supplying locally developed surface water directly to ACWD or to Zone 7 at the present time. There are no plans to construct major facilities to conserve surface water from local streams for later release in the service areas of ACWD or Zone 7. Negotiations are in progress with ACWD and the Pleasanton Township County Water District, located within the boundaries of Zone 7, concerning use of a maximum of 29,000 acre-feet of storage space in the reservoir behind Del Valle Dam to conserve runoff from Arroyo del Valle during the flood season and when not required for normal water supply.

Table 5 lists the major reservoirs contributing to the local water supply of the Santa Clara County Flood Control and Water District. Lake Elsman, with an estimated annual yield of 5,000 acre-feet of water, is the only reservoir which directly supplies surface water for domestic consumption. Water from this lake is transported to the City of San Jose through a 30-inch pipeline. Water released from the other reservoirs in Santa Clara County is used for ground water recharge and for surface water deliveries to agricultural users.

TABLE 5

Local Reservoirs Contributing
To SCCFC&WD Water Supply
(In Acre-Feet)

Reservoir	Storage Capacity
Almaden	1,960
Anderson	91,300
Calero	10,700
Coyote	24,510
Elsman	6,090
Guadalupe	3,450
Lexington	21,430
Stevens Creek	3,860
Vasona	750
Total number of acre-feet in storage	164,060

Ground Water Supplies

The safe ground water yield of the ground water basins used by the ACWD is estimated to be as high as 22,000 acre-feet per year, without recharge from the South Bay Aqueduct imported supplies. In Table 22 of Department Bulletin No. 13, Alameda County Investigation, published in March 1963, the estimated yield of ground water basins in the Bay Plain was shown as 27,000 acre-feet per year, with 22,000 acre-feet

annually available from the portion of the basin used by ACWD. However, this information may be modified by new data developed in more extensive ground water studies now underway in that area.

The safe ground water yield of the ground water basins used by Zone 7 is estimated to be 17,000 acre-feet per year. This is the same figure shown in Table 21 of Department Bulletin No. 13 as the ground water basin supply for the Livermore Valley. Since the Livermore Valley comprises most of the service area of Zone 7, the same figure can be assumed as the safe ground water yield available to this agency.

Studies by the United States Bureau of Reclamation, the Santa Clara County Flood Control and Water District, and the Santa Clara - Alameda - San Benito Water Authority resulted in an estimate of 180,000 acre-feet per year as the safe ground water yield from the basin in the Santa Clara Valley. The Santa Clara County 1964 annual report indicates that the SCCFC&WD has an estimated ground water yield of 180,000 acre-feet annually. In this report, this figure was used to estimate the safe ground water yield for the SCCFC&WD.

The Alameda County Water District has an annual ground water overdraft of 26,000 acre-feet, exclusive of imported water. The annual ground water overdraft of SCCFC&WD, exclusive of imported water, is 44,000 acre-feet.

Imported and Exported Water Supplies

In this report, imported water is considered to be water, other than South Bay Aqueduct water, which is received by the water agencies from sources outside their district boundaries.

In 1964, the Alameda County Water District entered into a contract with the City of San Francisco for imported water supplies from the Hetch Hetchy Aqueduct. During fiscal year 1964-1965, 1,500 acre-feet of water were delivered to ACWD from the Hetch Hetchy Aqueduct. The ACWD contract with the City of San Francisco calls for an annual increase of 500 acre-feet until the maximum annual entitlement of 10,000 acre-feet included in the contract is delivered by about 1981.

The Santa Clara County agency's 1964 annual report on ground water conditions reported that 11,000 acre-feet of water was imported into their service area from the Hetch Hetchy Aqueduct in 1963. By 1990, a maximum of 60,000 acre-feet is expected to be imported into the SCCFC&WD service area from the Hetch Hetchy Aqueduct. The SCCFC&WD will also receive water from the recently authorized federal San Felipe Project. The Bureau of Reclamation proposes that upon completion of the San Felipe Project, estimated to occur in 1975 a supply of 50,000 acre-feet will be required from this source by SCCFC&WD, based on 12,000 acre-feet of water from the Hetch Hetchy system and a total importation requirement of 150,000 acre-feet of water to meet the agencies needs.

Zone 7 does not anticipate the need to import water supplies from any other source than the South Bay Aqueduct of the State Water Project.

At the present time, water is not exported by any of the three South Bay Aqueduct contracting agencies.

Summary of Water Supplies

Table 6 presents a summary of the 1960 total estimated annual safe yield of water supplies developed within the service areas of the three agencies. Since the Del Valle Division of the South Bay Aqueduct is not yet in service, it is not listed as a source of water supply.

TABLE 6

1960 Safe Yield of Local Water Sources
In Acre-Feet Per Year

Agency	Source	Amount
ACWD	Ground water	22,000
Zone 7	Ground water	17,000
SCCFC&WD	Surface reservoirs <u>1/</u>	5,000
SCCFC&WD	Ground water	<u>180,000</u>
	Total	224,000
<u>1/</u> Domestic Supply		

Supplemental Water Requirements

The local water supplies within the service areas of the South Bay Aqueduct contracting agencies are considered to be fully developed, with the exception of percolation capacities which will be increased along the major stream channels. A summary of the total requirements, the locally developed supplies, the imported water, and the supplemental water required by each agency is shown in Table 7. Construction of Del Valle Dam and its reservoir is expected to be completed by 1970; therefore, runoff from Arroyo del Valle, regulated in this reservoir for ground water recharge, has been added to the available water supply for ACWD and for a local agency within the boundaries of Zone 7.

The supplemental water requirement for the Santa Clara County agency is approximately 27,000 acre-feet less than the amount of water it plans to import from the South Bay Aqueduct. This difference, or 27,000 acre-feet, is to be used to eliminate an accumulated overdraft of approximately 650,000 acre-feet of water.

Table 8 shows the net amount of water available to the contracting agencies to meet their supplemental requirements, including water from the South Bay Aqueduct and for the SCCFC&WD water to be imported from the San Felipe Project.

TABLE 7

Supplemental Water Requirements and Source of
Supply South Bay Aqueduct Contracting Agencies
(In Acre-Feet)

	ACWD			Zone 7			SCCFC&WD		
	1970	1980	1990	1970	1980	1990	1970	1980	1990
Requirements									
Urban	29,800	49,400	67,700	11,700	28,300	46,500	194,000	274,800	321,400
Agricultural	16,200	11,500	4,000	14,800	14,400	8,300	88,900	61,400	43,200
Total	46,000	60,900	71,700	26,500	42,700	54,800	282,900	336,200	364,600
Supply									
Local									
reservoirs	--	--	--	--	--	--	5,000	5,000	5,000
Ground water									
safe yield	22,000	22,000	22,000	17,000	17,000	17,000	180,000	180,000	180,000
Del Valle									
reservoir	3,200	3,200	3,200	3,000	3,000	3,000	--	--	--
Hetch Hetchy									
(imported)	3,500	8,500	10,000	--	--	--	40,000	50,000	60,000
Total	28,700	33,700	35,200	20,000	20,000	20,000	225,000	235,000	245,000
Supplemental									
requirement	17,300	27,200	36,500	6,500	22,700	34,800	57,900	101,200	119,600

TABLE 8

Comparison of Supplemental Water Requirements of
Contracting Agencies with Deliveries From South
Bay Aqueduct in Acre-Feet

	ACWD			Zone 7			SCCFC&WD		
	1970	1980	1990	1970	1980	1990	1970	1980	1990
Supplemental									
requirement	17,300	27,200	36,500	6,500	22,700	34,800	57,900	101,200	119,600
South Bay									
Aqueduct									
deliveries	16,200	24,800	36,900	10,000	22,000	32,000	88,000	88,000	92,000
From San Felipe									
Project							40,200	54,600	
Excess	-1,100	-2,400	+400	+3,500	-700	-2,800	+30,100	+27,000	+27,000

CHAPTER V. COST OF WATER SERVICE FROM THE SOUTH BAY AQUEDUCT

The annual cost to each of the three water agencies contracting for water service from the South Bay Aqueduct includes each agency's allocated portion of the construction costs of the Aqueduct and the operation and maintenance costs of the Aqueduct, plus the Delta Water Charge, and the agencies' own costs connected with local conveyance systems and treatment facilities.

Local conveyance systems and treatment facilities are constructed by each agency or by member units of the agencies. The South Bay Aqueduct was constructed by the State of California (the Del Valle Division is not yet completed) with funds received from the sale of general obligation bonds, authorized by the California Water Resources Development Bond Act approved by the electorate in 1960, and with other appropriate Project funds.

Capital costs associated with each reach of the South Bay Aqueduct are allocated to each agency on the basis of the proportionate-use method in accordance with Article 24 of the Water Supply Contract. Proportionate use is based on the average of two ratios:

- (1) The ratio of the contracting agency's maximum annual entitlement to be delivered from or through the reach to the total maximum annual entitlements to be delivered from or through the reach to all contracting agencies,
- and,
- (2) the ratio of the capacity in cubic feet per second provided in the reach for the transport and delivery of Project water to the contracting agency to the total capacity provided in the reach.

South Bay Aqueduct Contracts

The provisions included in the contracts between the State of California and the three South Bay Aqueduct contracting agencies are essentially similar. Major differences are in the amount of water contracted for.

Alameda County Water District Contract

The contract between the Alameda County Water District and the State provides for a maximum annual entitlement of 42,000 acre-feet of water from the South Bay Aqueduct. Initial delivery was made in 1962, with water released at the Altamont Turnout to flow through natural stream channels to the Niles Cone Ground Water Basin. Construction of a pipeline and canal system to transport water taken from the Vallecitos Turnout to Vallecitos Creek, near Scotts Corner, was completed in 1965. Water flows from Vallecitos Creek into Arroyo de la Laguna and then through natural stream channels to the Niles Cone Ground Water Basin. In the future, the ACWD will also take delivery of South Bay Aqueduct water at the Alameda-Bayside Turnout.

Alameda County Flood Control and Water Conservation District, Zone 7 Contract

The original contract between Zone 7 of the Alameda County Flood Control and Water Conservation District and the State provided for a maximum annual entitlement of 40,000 acre-feet of water from the State Water Project. The contract has been amended to provide for a maximum annual entitlement of 46,000 acre-feet of water. Water to be

used for ground water recharge is released at the Altamont Turnout for percolation through natural stream channels and through percolation ponds constructed for the purpose of using South Bay Aqueduct water for ground water recharge. Water from Patterson Reservoir, which is used for municipal and industrial purposes, is treated at an agency-operated water treatment plant adjacent to the reservoir. An additional water treatment plant, to be located near the South Livermore Turnout, is expected to be completed in the early 1970's. Zone 7 will continue to take delivery of most of its entitlement at the Patterson Reservoir.

Santa Clara County Flood Control and Water District Contract

The original contract between the State and the Santa Clara County water agency provided for a maximum annual entitlement of 88,000 acre-feet of water from the South Bay Aqueduct. The contract has been amended to provide for a maximum annual entitlement of 100,000 acre-feet of water. Initial delivery was made in July 1965 to the terminal facilities of the South Bay Aqueduct, located near Penitencia Creek in the City of San Jose.

Table 8, in Chapter IV, shows the supplemental water requirements of the three agencies contracting with the State for water from the South Bay Aqueduct, compared with the actual amounts of water shown in the individual contracts for the indicated year.

Water Service Costs

Table 9 shows estimated costs for water service from the South Bay Aqueduct for each of the three agencies over the entire repayment period: 1962 - 2039. These costs are based on 1966 data and are subject to future changes which will reflect the differences between estimated future costs and actual future costs.

Cost of Facilities

Table 9 lists the total capital costs of Project facilities, the maximum annual payment, including interest, which will be incurred in repaying the capital costs, and the estimated annual minimum and variable operation, maintenance, power, and replacement charges which will be incurred when the agencies' maximum annual entitlements are being delivered. The operation, maintenance, power, and replacement charges are assessed in two ways: (1) a minimum charge assessed annually for operation and maintenance of Project facilities, regardless of the amount of water delivered to the agency, and, (2) a variable charge assessed each year based on the actual amount of water delivered to the agency during that year.

TABLE 9

Estimated Facilities Costs

Agency	Capital Costs		Annual Operation, Maintenance, Power, and Replacement Costs	
	<u>Total Allocated</u>	<u>Annual Repayment</u>	<u>Minimum Charge</u>	<u>Variable Charge</u>
ACWD	\$ 7,075,153	\$ 309,103	\$ 57,055	\$131,370
Zone 7	6,639,737	305,992	57,216	143,882
SCCFC&WD	28,774,580	1,263,239	173,254	312,786

Delta Water Charge

The Delta Water Charge is the final component of annual costs for water deliveries to each agency from the South Bay Aqueduct. This charge is for repayment of all costs associated with conservation facilities connected with the State Water Project. All water users of State Water Project facilities are assessed this charge. At the present time, the Delta Water Charge is \$3.50 per acre-foot of water, through 1969. It is estimated that the Delta Water Charge will be \$6.39 per acre-foot of water after 1969, with the presently authorized facilities of the Project.

Total Costs

Table 10 shows the total estimated charges for State Water Project water service and the equivalent unit rate of Project water for each agency contracting for service through the South Bay Aqueduct over the entire repayment period of 1962 through 2039. The equivalent unit rate is one which if applied to each acre-foot of delivery over the entire repayment period will equal the total charges accumulated with interest during the Project repayment period. The total cost to each contracting agency includes the Delta Water Charge, the allocated capital costs, and all allocated annual costs of the South Bay Aqueduct. The total cost is based on the capitalization of all costs at 3.7 percent interest.

TABLE 10

Total Costs

Agency	Total Water Charges <u>1/</u>	Equivalent Unit Rate <u>2/</u>
ACWD	\$ 45,785	\$21.21
Zone 7	45,489	22.22
SCCFC&WD	145,678	25.59
<u>1/</u> Thousands		
<u>2/</u> Per acre-foot		

Cost of Local Conveyance Systems and Water Treatment Facilities

An additional cost component the South Bay Aqueduct contracting agencies will bear is the cost of the conveyance systems and water treatment facilities they must provide for themselves. These facilities are constructed by each agency or by member units of the agencies. The costs associated with construction, operation, and financing of these local facilities are not directly connected with each agency's repayment schedule for its allocated share of the costs of the South Bay Aqueduct, but they are included in this report to show the total-water-systems cost borne by each of the South Bay Aqueduct contracting agencies.

Estimates of costs of conveyance systems and water treatment facilities depend on several factors: location of the ultimate water user in relation to location of the water supply, the quantity of water to be delivered, the purpose for which the water will be used, and the quality of the raw water to be treated. These factors differ with each of the three contracting agencies discussed in this report, consequently, the local costs are estimated to be different for each agency.

Alameda County Water District

The Alameda County Water District has constructed a canal and pipeline system to carry South Bay Aqueduct water from the Vallecitos Turnout into Vallecitos Creek. From there the water flows to Arroyo de la Laguna and other natural stream channels to the Niles Cone Ground Water Basin.

Water treatment facilities provided by this agency will consist primarily of water softening plants. Two such plants are proposed or under construction; the largest will have a capacity of approximately 28,600 acre-feet of water per year. A filtration plant is scheduled to be constructed near the Alameda-Bayside Turnout of the South Bay Aqueduct in 1968. Additional improvements to the agency's distribution system, including a well field, will be completed by 1970. These facilities will be required to meet the needs of the agency through 1972, and will cost an estimated \$6,100,000.

Alameda County Flood Control and Water Conservation District, Zone 7

Zone 7 currently treats South Bay Aqueduct water at their Patterson Treatment Plant for distribution to the City of Livermore through a pipeline system from the plant to the City. They also have a ground water recharge system in the western part of the Livermore Valley for percolating South Bay Aqueduct water into the ground water basin. The total cost of the agency's present local conveyance and treatment facilities is approximately \$1,800,000. Additional facilities, including pipelines, wells, recharge facilities, and a treatment plant to be constructed near the South Livermore Turnout in the 1970's will raise the total cost of the District's local facilities to \$5,750,000.

Santa Clara County Flood Control and Water District

A system for distribution and treatment of water from the South Bay Aqueduct and from the San Felipe Project is currently under construction in Santa Clara County. A 13-mile central pipeline to transport water from the terminal facilities of the South Bay Aqueduct to percolation ponds near Vasona Reservoir was completed in time for initial delivery of South Bay Aqueduct water in 1965. A cross-valley pipeline, scheduled for completion around 1970, will extend from the terminus of the San Felipe Project at Anderson Reservoir, northwest to Calero Reservoir and then to Vasona Reservoir. Other pipelines scheduled for construction are the eastside pipeline, to serve the cities of Milpitas and San Jose, and the Evergreen area; and, the westside pipeline, to serve the cities of Los Altos, Mountain View, Campbell, and Santa Clara.

The Rinconada Water Treatment Plant, with the capacity to treat 120,000 acre-feet of water annually, was placed in service in 1967. It is located in the western portion of the County. Future plans call for construction of the Penitencia Water Treatment Plant, to be built in the eastern portion of the County near the South Bay Aqueduct terminal facilities. This plant will have the capacity to treat 80,000 acre-feet of water annually.

The Santa Clara County Flood Control and Water District's local conveyance and water treatment facilities are estimated to cost \$42,000,000.

CHAPTER VI. FINANCIAL CAPABILITY OF CONTRACTING AGENCIES

The most important element to consider relative to execution of water service contracts between the State and the contracting water agencies is the financial capability of the agencies to repay State Water Project costs.

Financial capability of a water agency indicates that the public credit of the agency is strong enough to financially support and repay the long-term debt which the agency will incur when it contracts with the State for importation of water.

It is necessary to show that the overall debt of each of the three South Bay Aqueduct contracting agencies will not be unduly burdensome during the Project repayment period. The methods each agency will use to obtain funds for debt repayment must be practical and reasonable.

Historic and Projected Assessed Valuations

From 1959-60 through 1964-65, the assessed valuation of Zone 7 increased by 65 percent. The 1964-65 valuation represents an estimated market value to \$333,678,000. From 1959-60 through 1964-65, the assessed valuation of the ACWD increased by 124 percent, and the assessed valuation in the Santa Clara County agency increased by 73 percent.

Historic and projected assessed valuations of the three agencies are shown in Table 11. Projections were made based on the assumption that during the next thirty years the assessed valuation per capita would remain at the present level. Population projections for the areas served by the three agencies used in this study are shown in Table 1, page 13.

TABLE 11

Historic and Projected Assessed Valuation
1959-1960 to 1990

Year <u>2/</u>	Assessed Valuation <u>1/</u>			Assessed Valuation Per Capita		
	ACWD	Zone 7	SCCFC&WD	ACWD	Zone 7	SCCFC&WD
1959-60	\$ 80,198	\$ 46,900	\$ 900,455	\$1,410	\$1,735	--
1960-61	92,332	53,500	1,051,079	1,362	1,755	--
1961-62	109,502	59,021	1,176,000	1,370	1,725	--
1962-63	124,184	63,606	1,277,085	1,380	1,740	--
1963-64	148,070	68,237	1,405,009	1,480	1,720	\$2,170
1964-65	179,989	77,248	1,553,940	1,640	1,732	2,030
1970	278,800	116,245	2,101,000	1,640	1,735	2,000
1980	442,800	277,600	2,790,000	1,640	1,735	2,000
1990	590,400	451,100	3,230,000	1,640	1,735	2,000
<u>1/</u> Thousands						
<u>2/</u> Fiscal year ending June 30						

Historic, Present, and Projected Bonded Indebtedness

Table 12 shows the total long-term indebtedness of the three agencies as of June 30, 1964. Types of debt included general obligation bonds, special assessment bonds, and State school loans. Self-supporting general obligation bonds were deducted from the gross to give the net general obligation bonded debt for each agency as of that date. Total school debts of all kinds accounted for \$285,237,000.

TABLE 12

Indebtedness of South Bay Aqueduct Contracting Agencies ^{1/}
As of June 30, 1964

	ACWD	Zone 7	SCCFC&WD
County	\$ --	\$ --	\$ 53,300,000
Cities	7,160,000	1,606,000	89,708,000
School Districts	14,191,000	7,214,000	120,475,000
Flood Control and Water Conservation Districts	5,277,000	347,000	10,975,000
Special Districts	<u>5,524,000</u>	<u>899,000</u>	<u>12,283,000</u>
<u>Total General</u> <u>Obligation Bonds</u>	\$32,152,000	\$10,066,000	\$286,741,000
State School Loans	28,662,000	6,330,000	108,365,000
Special Assessment Bonds	<u> </u>	<u> </u>	<u>1,475,000</u>
<u>Total Long-Term Debt</u>	\$60,814,000	\$16,396,000	\$396,581,000
Less Self-Supporting General Obligation Bonds	79,000	0	2,841,000
Less School Loans and Special Assessments	28,662,000	6,330,000	109,840,000
<u>Net General</u> <u>Obligation Bonds</u>	<u>\$32,073,000</u>	<u>\$10,066,000</u>	<u>\$283,900,000</u>
^{1/} Excludes any direct water system debt of agency. Zone 7 debt for flood control improvements only.			

The amount of the county debt and the debt of the cities in the counties causes a significant difference in the composition of the total indebtedness of the water agencies in Alameda and Santa Clara counties. Alameda County has no bonded debt at present, and the cities within the boundaries of the two Alameda County water agencies account for a little over 10 percent of the total long-term debt. In Santa Clara County, the combined debt of the County and cities accounts for approximately 36 percent of such long-term debt. Although the composition of the indebtedness varies, the total debt of the cities, the county, and the schools for each of the three water

agencies is comparable when expressed as a percent of the total long-term debt: 91 percent of such debt in Zone 7, 82 percent of such debt in the ACWD, and 93 percent in the SCCFC&WD.

Table 13 shows comparisons of the historic gross and net general obligation bonded debt, and the assessed valuation of each agency for the five-year period 1960-1964.

TABLE 13
Historic Bonded Indebtedness and Assessed Valuation
South Bay Aqueduct Contracting Agencies

Agency	Year	Assessed valuation <u>1/</u>	Gross general obligation bonds <u>1/</u>	Net general obligation bonds <u>1/</u>	Net general obligation as % of assessed valuation
ACWD	1959-1960	\$ 80,198	\$ 16,179	\$ 16,159	20.1%
	1960-1961	92,332	18,989	18,970	20.5%
	1961-1962	109,502	21,246	21,228	19.4%
	1962-1963	124,184	20,869	20,789	16.7%
	1963-1964	148,070	32,152	32,073	21.7%
Zone 7	1959-1960	\$ 47,130	\$ 5,351	\$ 5,351	11.4%
	1960-1961	53,654	6,396	6,396	11.9%
	1961-1962	59,020	6,731	6,731	11.4%
	1962-1963	63,606	7,707	7,707	12.1%
	1963-1964	68,237	10,066	10,066	14.8%
SCCFC&WD	1959-1960	\$ 900,455	\$155,642	\$154,205	17.1%
	1960-1961	1,051,079	188,424	186,601	17.8%
	1961-1962	1,176,000	247,677	245,195	20.8%
	1962-1963	1,277,085	264,266	261,347	20.5%
	1963-1964	1,405,009	286,741	283,900	20.2%
<u>1/</u> Thousands					

Although assessed valuations within the area of the three water agencies increased substantially in the five-year period 1960-1964, bonded indebtedness increased faster. During this period, the ratio of bonded debt to assessed valuation of the ACWD increased by 1.6 percent, or to 21.7 percent. The ratio of bonded debt to assessed valuation of Zone 7 increased by 3.4 percent, or to 14.8 percent, and the ratio of debt to assessed valuation of the Santa Clara County agency increased by 2.4 percent, or to 19.8 percent.

Estimates of the authorized but unissued general obligation bonds for districts within the boundaries of the three agencies are shown in Table 14. Because of the difficulty involved in projecting actual dates of issuance and maturity schedules on the unissued bonds as related to the retirement of the outstanding debt, it is estimated that the percentage of bonded debt to assessed valuation in the three agencies would increase slightly over 1964 levels by 1970, and would remain constant thereafter.

TABLE 14

Authorized But Unissued General Obligation Bonds
As of June 30, 1964
(thousands of dollars)

	ACWD	Zone 7	SCCFC&WD
County	\$ --	\$ --	\$ 21,580
Cities	53	200	11,843
School	3,273	4,556	71,969
Special	44,657 ^{1/}	13,464 ^{2/}	10,982
District direct	<u>5,890</u>	<u>2,914</u>	<u>26,550</u>
Total	\$53,873	\$21,134	\$142,924
^{1/} Bay Area Rapid Transit District Bonds amount to \$31,680,000 of total.			
^{2/} Bay Area Rapid Transit District Bonds.			

Analysis of Financing Future Obligations

To determine the financial ability of the water agencies to support water service contracts, several interrelated factors were analyzed. These included determination of the amount of money required to pay for the allocated share of costs of the State Water Project, as shown in Table 15, the probable repayment schedule, the present and future assessed valuation of each agency, its current and estimated future debt for other public works, prevalent tax rates, and additional tax rates necessarily incurred through the water importation project. The actual repayment plan of each agency was not considered in this analysis. Such repayment plans could vary considerably from the one assumed in this study, the purpose of which was merely to demonstrate that each of the contracting agencies could meet the projected total capital cost repayment from revenues derived from reasonable ad valorem taxes.

TABLE 15

Capital Repayment Obligation South Bay Aqueduct Agencies

Agency	Year	Local Conveyance Facilities	State Water Facilities	Total	Total Obligation as Percent of Assessed Valuation
ACWD ^{1/}	1964	\$ 3,635,000	\$ 5,060,856	\$ 8,695,856	5.9%
	1970	8,578,000	6,679,611	15,257,611	5.5%
	1980	4,962,000	5,969,285	10,931,285	2.5%
	1990	1,369,000	4,887,000	6,256,000	1.0%
Zone 7	1964	\$ 2,037,000	\$ 3,913,561	\$ 5,950,561	8.7%
	1970	1,618,000	6,375,675	7,993,675	6.9%
	1980	2,940,000	5,769,433	8,709,433	3.2%
	1990	6,500,000	4,753,000	11,235,000	2.4%
SCCFC&WD	1964	\$15,500,000	\$18,265,000	\$33,765,000	2.4%
	1970	39,740,000	25,622,000	65,362,000	3.3%
	1980	33,530,000	22,140,000	55,670,000	2.0%
	1990	24,360,000	17,600,000	41,960,000	1.3%
^{1/} For ACWD only indebtedness for Improvement District #1 is shown; repayment schedule for Improvement District #3 not set at this time.					

Specifically, several factors relating to water service to the three agencies should be considered:

(1) On December 30, 1963, the Alameda County Flood Control and Water Conservation District, Zone 7, amended its contract to increase its maximum annual entitlement of water by 6,000 acre-feet to a total of 46,000 acre-feet. During the negotiations for this increase, an agreement was reached concerning the contract amendment. Under an option provided in Article 45 of the contract, the agency is permitted to defer payment on the principal for nine years. The option was granted after consideration of the agency's water revenues, operating costs, assessed valuations, and the ad valorem tax limitation established by agency policy.

(2) The use of Arroyo del Valle water as a source of supplemental supply is under consideration by a local agency located within the boundaries of Zone 7, and by the Alameda County Water District. Such use would require each agency to repay part of the cost of the reservoir behind Del Valle Dam which has been allocated to water supply. Operation and cost distribution studies are completed. Contract negotiations are currently underway between the Department of Water Resources and the local water agencies. Since these negotiations are not completed, the analysis in this report does not include the effect these costs may have on the agencies' total repayment obligation if use of the locally conserved water stored behind Del Valle Dam becomes an actuality.

(3) The Santa Clara County water agency plans to start importing water from the United States Bureau of Reclamation's San Felipe Project when completed. To date, the contract for this water has not been signed; therefore, the agency's actual repayment obligation for this water is not known. For this reason, the analysis does not include the potential repayment obligation for importation of San Felipe Project water to Santa Clara County. However, the local conveyance costs used in this analysis are for facilities which have been sized to handle imports from both the South Bay Aqueduct and the San Felipe Project.

For purposes of this report, the net general obligation bonded debt of the three South Bay Aqueduct contracting agencies is projected to remain at these levels from 1970 to 1990:

Net general obligation debt as a	
percent of assessed valuation	ACWD - - - - - 22%
	Zone 7 - - - - - 16%
	SCCFC&WD - - - - - 21%

Comparison of Debt With Assessed Valuation

The estimated construction costs and the cost of local conveyance facilities were used to determine the total debt on the transportation portion of the State Water Project and local conveyance facilities outstanding in any one year. This was then calculated as a percentage of assessed valuation. These data are shown in Table 15.

The debt ratio of the Alameda County Flood Control and Water Conservation District, Zone 7, was highest in 1964; the total obligation for water service and other public debt was estimated to be about 23.5 percent. It is anticipated that this ratio will decrease to 23 percent in 1970 and then level off at 19 percent from 1980 through 1990. The Alameda County Water District also had its highest debt ratio in 1964; the total obligation for water service and other public debt was approximately 27.6 percent. The debt ratio for this agency in 1970 is estimated to be 27.5 percent, for 1980 the debt ratio is estimated at 24.5 percent, and by 1990 the debt ratio should be 23 percent. For the Santa Clara County agency, the total obligation for water service and other

and other public debt is estimated to reach its highest point, 24 percent, in 1970. In comparing the debt ratio with the repayment schedules, it was found that the largest payments commence as the debt ratios decrease.

Although the debt ratios are high, especially for the two water agencies in Alameda County, in view of the nature of the areas involved, the ratios are not considered unreasonable. Southern Alameda County is experiencing a change in environment: from rural-agricultural to urban-residential, commercial, and industrial. Such change necessitates incurring debt for the many public and community facilities needed to serve the new interests. Santa Clara County is one of the fastest growing counties in the State of California. This growth is expected to continue. The projected ratios of debt to assessed valuation do not indicate that the three water agencies will be unduly burdened, or that their public credit will be endangered by their overall debt during the State Water Project repayment period.

Levels of Ad Valorem Taxation

Tax rates in the areas served by the three agencies have tended to increase in the past few years, as have tax rates in most areas of the State. Table 16 shows the weighted average tax rates and their component parts for the areas served by the three contracting agencies for the period 1959-1960 through 1963-1964, and the projected maximum ad valorem taxes for both the local conveyance facilities and the capital-cost component of the State Water Project.

The annual repayment requirements, as estimated for both the local conveyance facilities and the capital-cost component of the transportation portion of the State Water Project, were compared with projections of assessed valuations in each of the service areas. In this way, the tax rates necessary for capital repayment could be determined. This was required to determine the rate of taxation necessary, in the event all capital repayment obligations were collected through ad valorem taxation. It should be realized that local conveyance costs are actually paid by other means, and the assumption is made here merely to demonstrate that the State could expect repayment for the capital cost of idle facilities.

In Zone 7, the tax rate necessary for capital repayment of the local conveyance facilities and the facilities of the State Water Project is estimated to range between 0.44 and 0.38 per \$100 assessed valuation during the period 1970 through 1980. The average tax rate in the area during the 1963-1964 fiscal year was \$8.79 per \$100 assessed valuation. Assuming the other taxes were held constant at the 1963-1964 tax level, the total tax rate during the 1970-1980 period would range between \$9.23 and \$9.17 per \$100 assessed valuation.

In the area served by the Alameda County Water District, the additional tax necessary for capital repayment of the local conveyance facilities and the facilities of the State Water Project would be 0.30 and 0.36 per \$100 assessed valuation in 1970 and 1980. In the 1963-1964 fiscal year, the average tax rate in the area was \$9.13 per \$100 assessed valuation. The combined total tax rate would range between \$9.43 and \$9.49 per \$100 assessed valuation during the period 1970 through 1980. The countywide average tax rate for the 1963-1964 period was \$9.73 per \$100 assessed valuation.

In the Santa Clara County Flood Control and Water District service area, the taxes necessary for repayment of the capital cost of the local conveyance facilities and the facilities of the State Water Project would reach a maximum in 1970. The average tax rate during the 1963-1964 fiscal year was \$8.42 per \$100 assessed valuation. Assuming the other taxes held constant at the 1963-1964 level, as shown in Table 16, the additional taxes required in the SCCFC&WD service area in 1970 would create a tax rate of 0.16 per \$100 assessed valuation, and the estimated combined overall tax rate would be \$8.58 per \$100 assessed valuation.

TABLE 16

Historic and Projected Maximum Ad Valorem Tax Rates of South Bay Aqueduct
Contracting Agencies in Dollars per \$100 Assessed Valuation

Agency	Year	City	County	School Districts	Special Districts	Water Agency	Total
ACWD	1959-1960	.87	2.30	4.19	.965	.125	8.45
	1960-1961	.98	2.30	4.21	.965	.105	8.56
	1961-1962	.98	2.30	4.19	.96	.28	8.71
	1962-1963	1.02	2.27	4.30	1.00	.28	8.93
	1963-1964	1.02	2.24	4.56	1.05	.26	9.13
	<u>1/</u> 1970-1980						
	Min.	1.02	2.24	4.56	1.05	.56	9.43
	Max.	1.02	2.24	4.56	1.05	.62	9.49
Zone 7	1959-1960	.25	2.30	4.90	.658	.012 ^{2/}	8.12
	1960-1961	.25	2.30	4.90	.678	.012	8.23
	1961-1962	1.80	2.30	3.75	.355	.165	8.37
	1962-1963	1.77	2.27	3.99	.385	.165	8.58
	1963-1964	1.73	2.24	4.24	.415	.165	8.79
	<u>1/</u> 1970-1980						
	Min.	1.73	2.24	4.24	.415	.545	9.17
	Max.	1.73	2.24	4.24	.415	.605	9.23
SCCFC&WD	1959-1960	1.25	1.75	3.90	.32	.02	7.24
	1960-1961	1.24	1.74	4.14	.34	.10	7.56
	1961-1962	1.24	1.79	4.56	.44	.06	8.09
	1962-1963	1.24	1.80	4.63	.40	.10	8.17
	1963-1964	1.25	1.92	4.78	.37	.10	8.42
	1970-Max.	1.25	1.92	4.78	.37	.26	8.58
<u>1/</u> Estimated maximum and minimum range of annual tax necessary for capital repayment of the water facilities for the period 1970 through 1980, assuming that all other taxes remain constant at the 1963-1964 peak level (except for SCCFC&WD where the peak is reached in 1970).							
<u>2/</u> Does not include tax levied on land and improvements for bond redemption.							

For this analysis, it was assumed that capital repayment for both local conveyance facilities and the facilities of the State Water Project could be through ad valorem taxation and that, in the future, other ad valorem property taxes would remain at the 1963-1964 levels. Consideration was given to projected tax rates and to the ratio of bonded debt and water service contract debt to future assessed valuations, under conditions of water importation. These conditions were compared to conditions in other parts of the State.

This analysis of the problem of financing future obligations shows that the three water agencies presently contracting for service from the South Bay Aqueduct of the State Water Project could, if necessary, successfully meet their obligations to the State of California by the use of an ad valorem tax.

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FIGURE 3

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